Supporting Information

Electrochemical Lithiation of Covalently Bonded Sulfur in Vulcanized Polyisoprene

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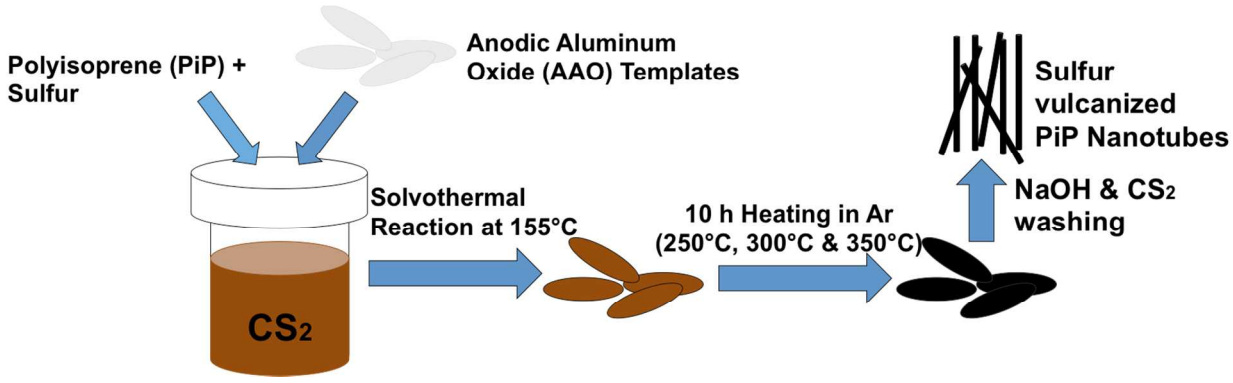

Scheme S1. Synthetic process of SPIP nanowires.

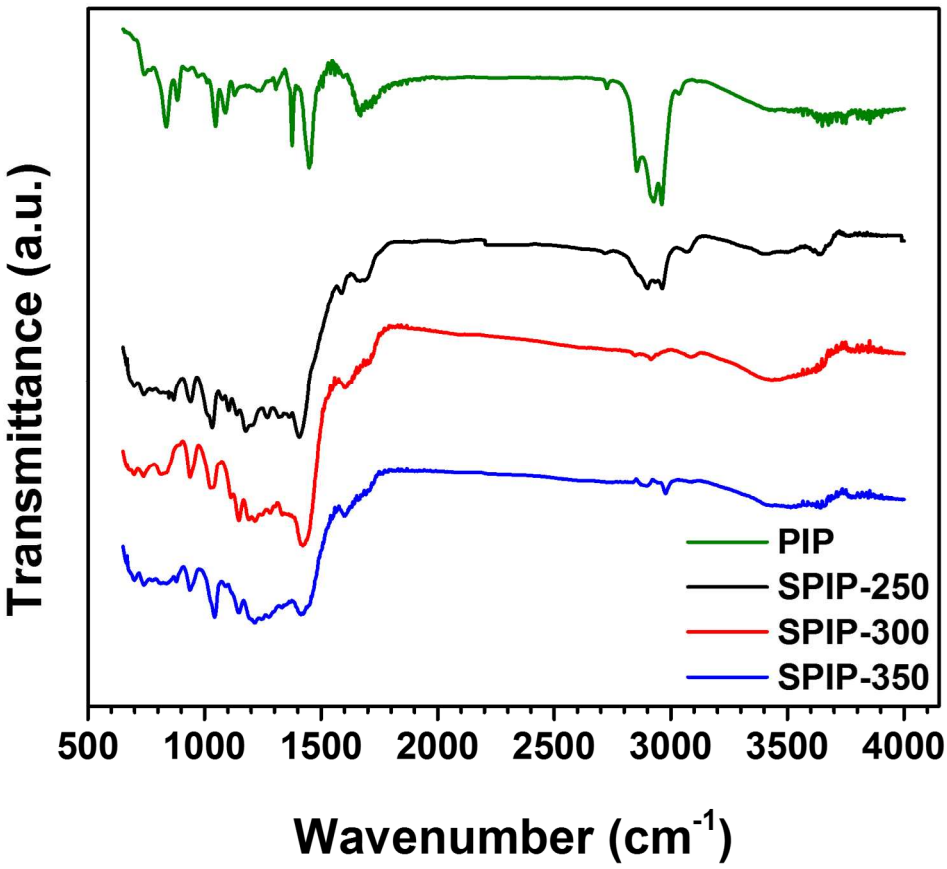

Figure S1. FTIR spectra of the pristine PIP, vulcanized SPIP-250, SPIP-300 and SPIP-350. The spectra of pristine PIP clearly show the C=C stretch at 1680 cm^{-1}, C-H and =C-H_2 stretches between 2850 cm^{-1} to 3050 cm^{-1}. The magnitudes of all these peaks are reduced after vulcanization but remain detectable, indicating vulcanization reactions including free radical addition to the vinyl group and dehydrogenization of the allylic hydrogens.

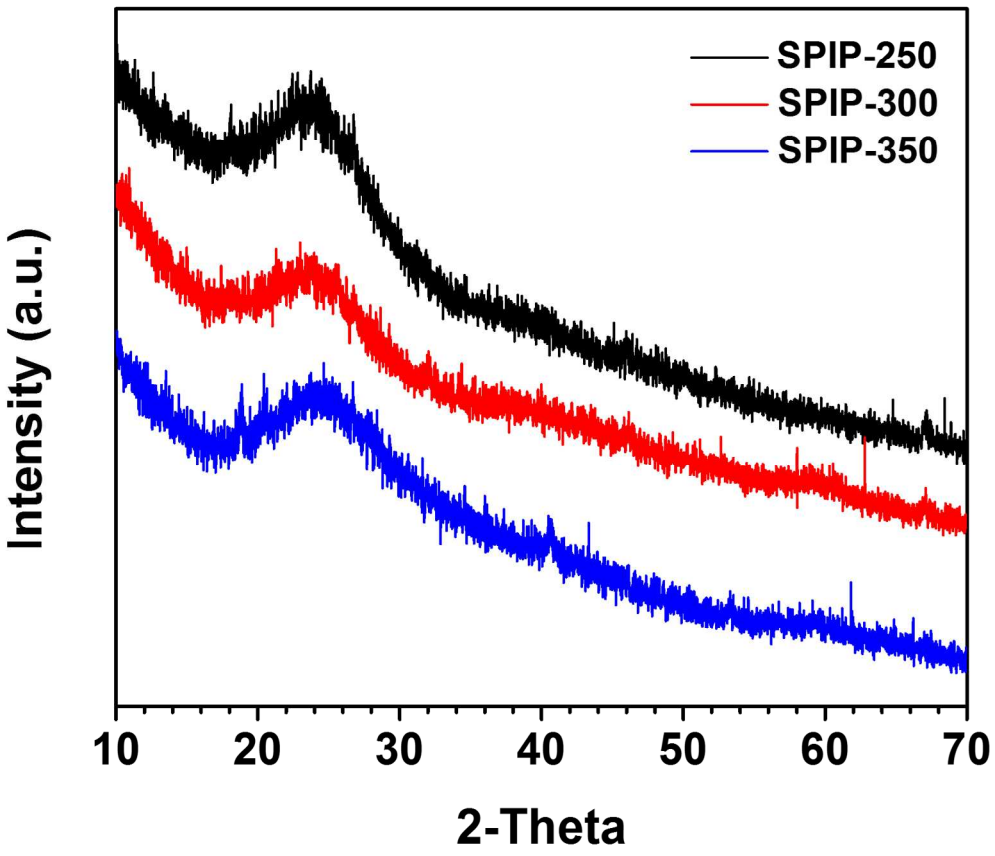

Figure S2. Powder XRD pattern of SPIP-250, SPIP-300 and SPIP-350 compounds.

EAI ~ Elemental Analysis, Inc.

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Sulfur by Colorimetric Titration

Sample ID	Sulfur (wt%)
SPIP 250°C	49.13%
SPIP 300°C	48.25%
SPIP 350°C	25.45%

Respectfully Submitted,
Elemental Analysis Incorporated

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Technical Sales Representative

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Table S1. Sulfur content analysis of SPIP-250, SPIP-300 and SPIP-350 performed by Elemental Analysis Incorporated.

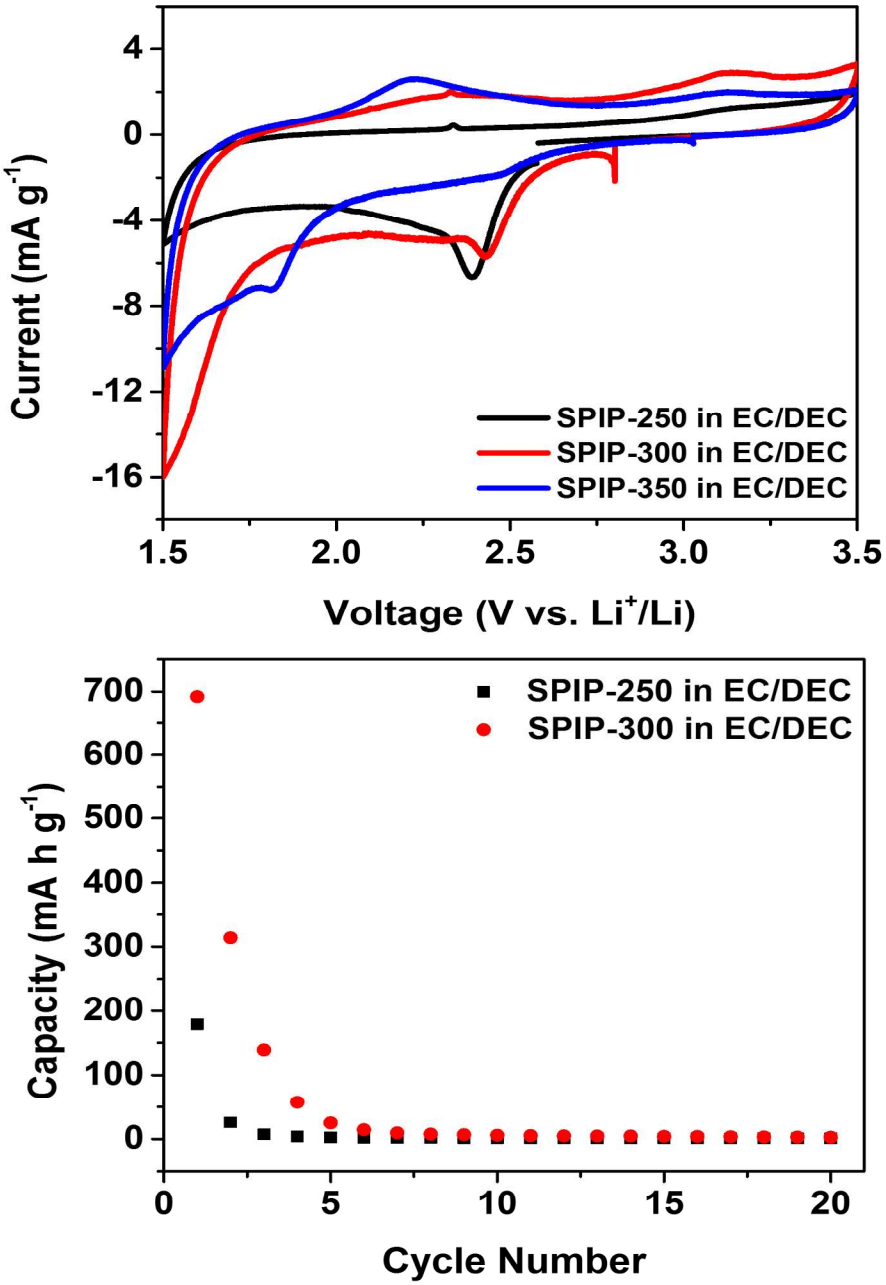

Figure S3. CV scans and cycle stability of SPIP compounds in electrolyte composed of 1 M $LiPF_6$ in ethylene carbonate/diethyl carbonate (50/50 volume ratio).

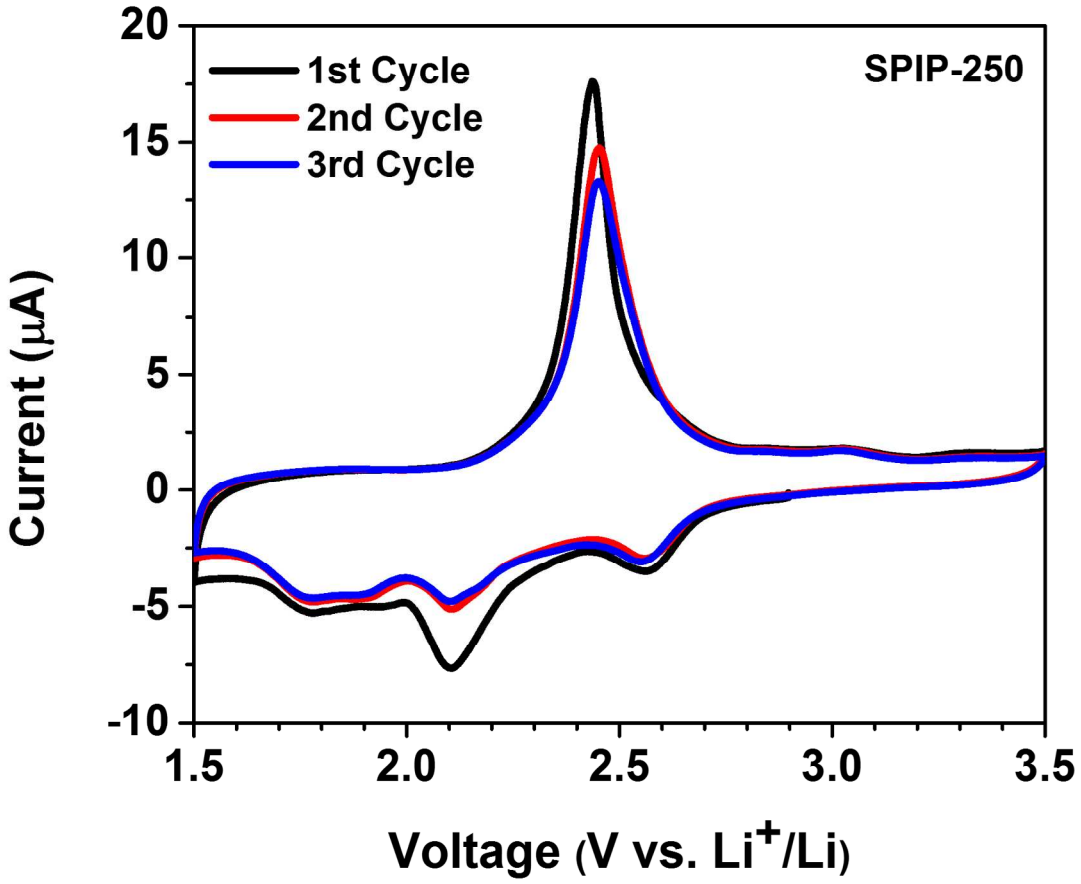

Figure S4. Complete three CV cycles of SPIP-250.

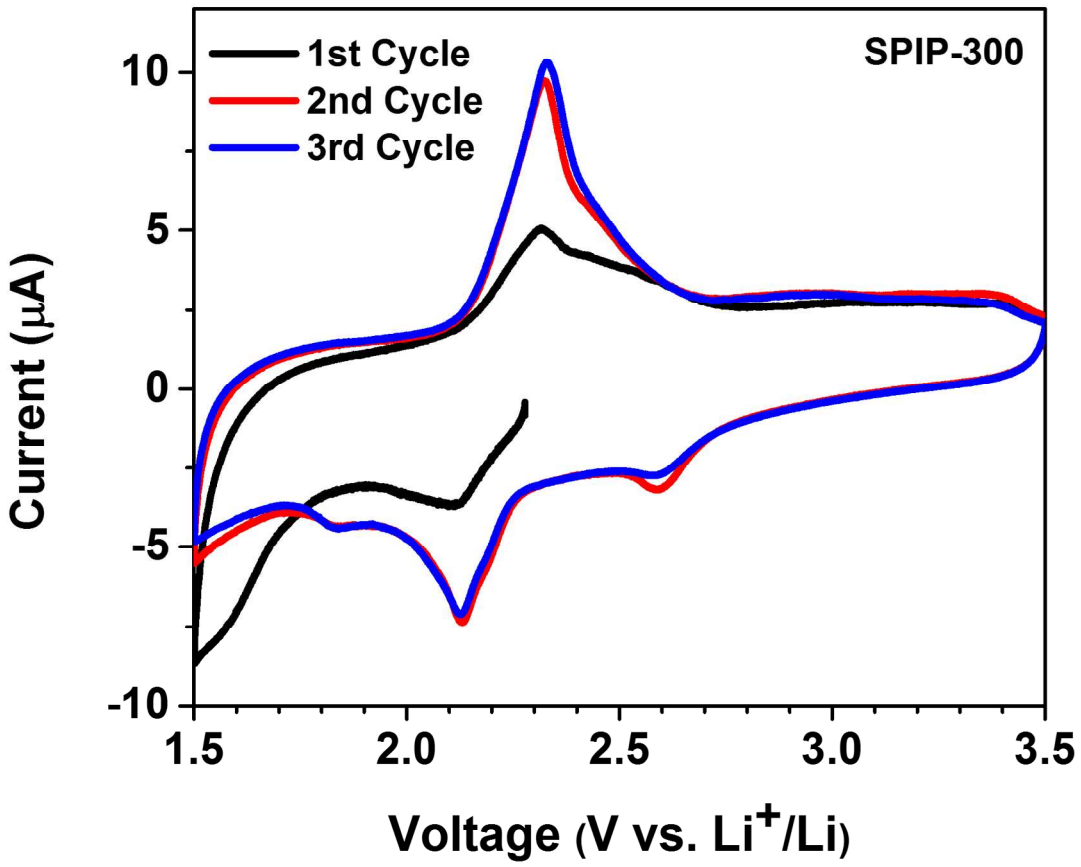

Figure S5. Complete three CV cycles of SPIP-300.

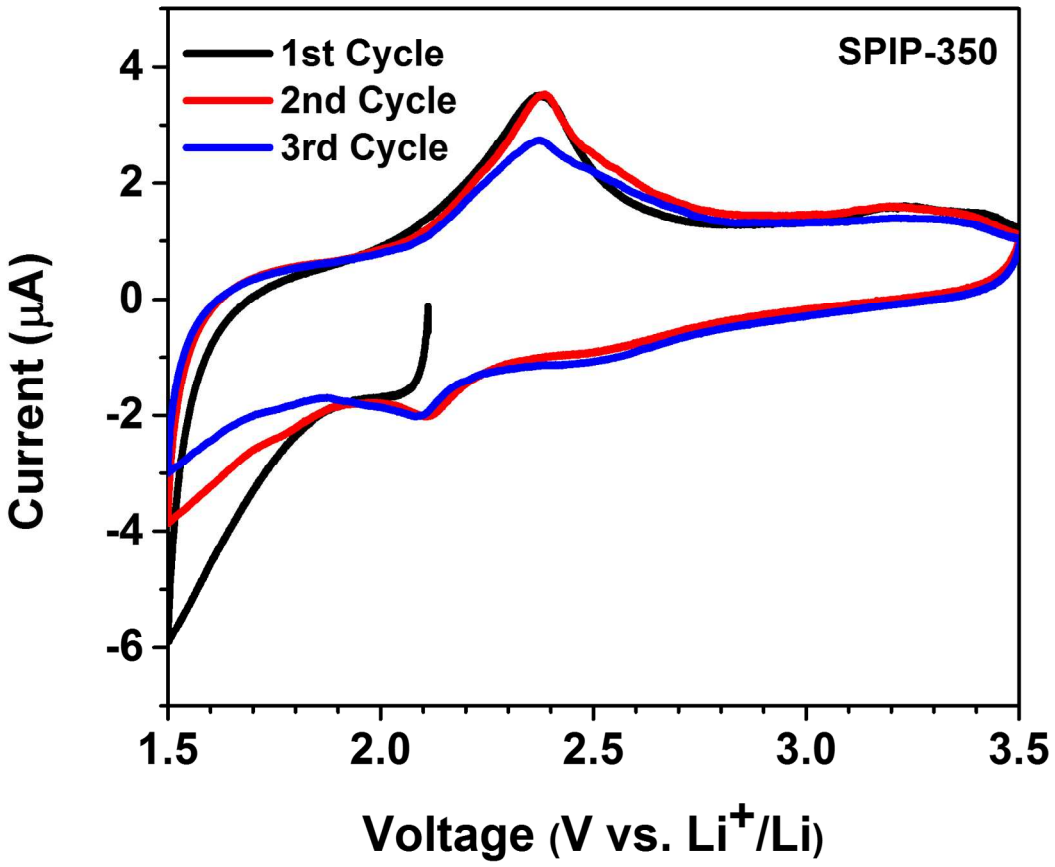

Figure S6. Complete three CV cycles of SPIP-350.

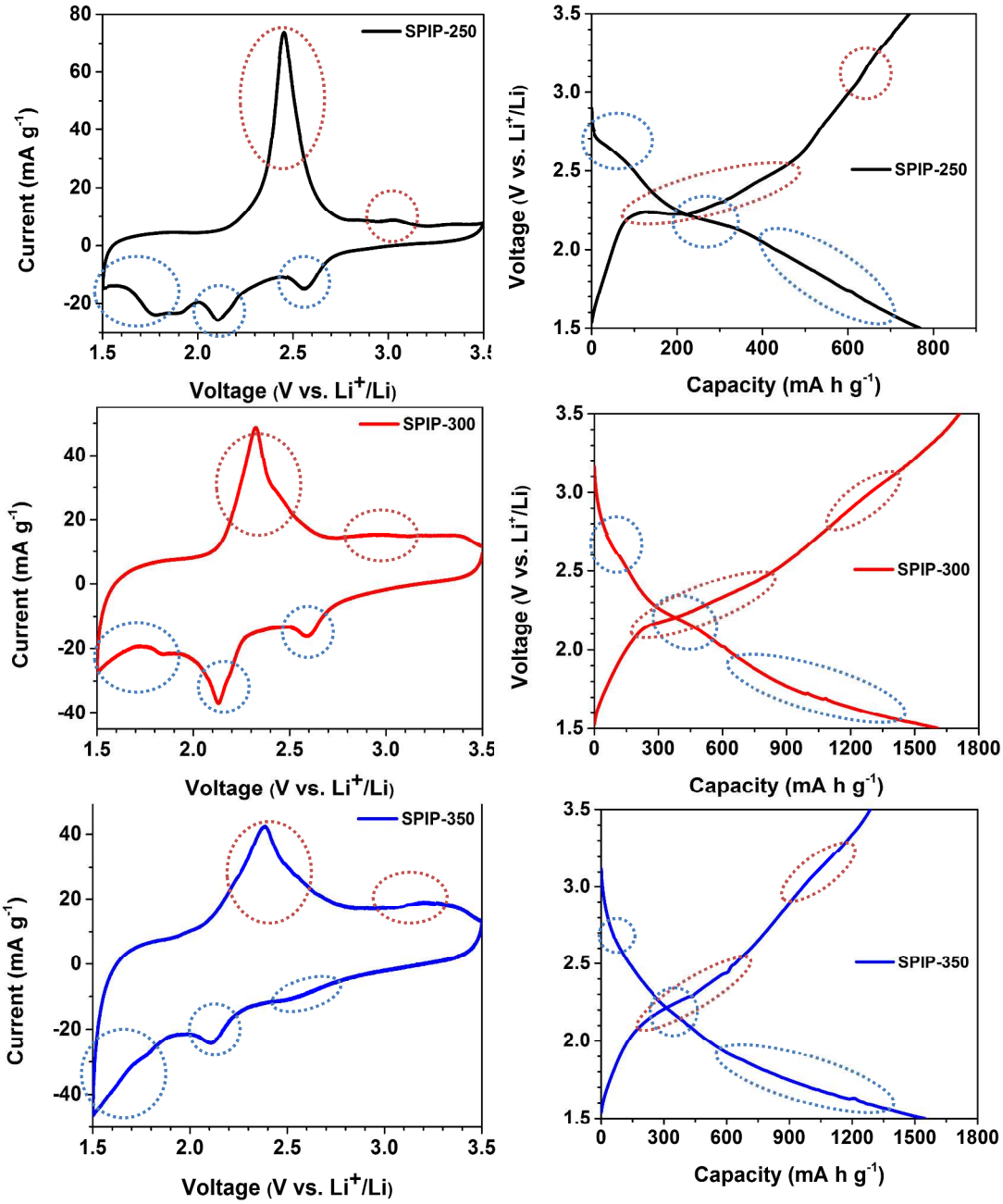

Figure S7. Parallel comparison of CV curves and charge-discharge potential profiles of each SPIP compound.